HINGE MECHANISM OF PORTABLE PHONE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a portable phone, and more particularly to a hinge mechanism for use in a flip type or folder type portable phone for mechanically coupling a flip cover or folder to a phone body.

2. Description of the Related Art

Portable phones are portable communication terminals such as cellular phones, hand-held phones (HHPs), CT-2 phones, and personal communication service (PCS) phones. Such portable communication terminals have a communication function for conducting radio communications with a base station.

Currently, developments of such portable communication terminals are kept in pace with the tendency of electronic elements to provide a high sound sensitivity, as well as a light and compact device. For portable phones, there are various constructions such as, for example, a bar type, a flip type, and a folder type construction.

Although the bar type, flip type and folder type portable phones are currently used, the tendency toward the use of flip type or folder type portable phones is increasing gradually. The reason why the use of flip type or folder type portable phones is increasing currently is because a flip cover or folder coupled to a phone body serves to protect a plurality of keys on the phone body, thereby preventing erroneous operations of those keys, while additionally serving as a reflecting plate for concentrating sound, thereby enhancing the sound sensitivity. Further, the flip type or folder type construction is advantageous in that a microphone unit or speaker unit can be installed on the flip cover or folder resulting in a compact phone body.

Typically, flip type portable phones include a phone body, a flip cover, and a hinge mechanism adapted to mechanically couple the flip cover to the phone body. Such flip type portable phones are designed so that its operation mode is automatically switched between a conversation mode and a call waiting mode in accordance with open and closed states of the flip cover, respectively. On the other hand, folder type portable phones typically have a construction including a phone body, a folder, and a hinge mechanism adapted to mechanically and electrically couple the folder to the phone body.

Although the current tendency of portable phones is to provide a more compact phone construction, the minimum size of the phone is limited since it is necessary to ensure a minimal overall length corresponding to the distance between the mouth and ear of the user. In portable phones, a distance of about 14 cm or more should be maintained between a voice transmitter, on which a microphone unit is installed, and a voice receiver, namely, an ear piece on which a speaker is installed. The distance between the voice transmitter and voice receiver is termed a "conversation distance". In order to provide a compact phone body while accommodating the limitation resulting from the necessity of the conversation distance, an arrangement has been proposed in which the microphone unit is installed on the flip cover in the case of flip type portable phones. For the same purpose, in the case of folder type portable phones, an arrangement has been proposed in which the speaker is installed on the folder, along with an LCD unit.

Meanwhile, a hinge mechanism for flip type portable phones is disclosed in U.S. Pat. No. 5,697,124 issued to Jong Gab Jung, assigned to Samsung Electronics Co., Ltd., Korea, and entitled "HINGE MECHANISM FOR FOLDABLE ELECTRONIC APPARATUS". However, the hinge mechanism disclosed in this patent also has numerous problems.

The hinge mechanism disclosed in the U.S. Pat. No. 5,697,124 includes a pair of hinge modules installed in a receiving part of a phone body in a symmetric fashion. Each hinge module includes a hinge shaft, a hinge cam, a spring, and a hinge cover assembled together in a hinge housing. However, the hinge mechanism occupies a large space because its hinge modules, which consist of a plurality of elements, should be arranged in a symmetric fashion. For this reason, this construction adversely affects the compactness of the phone body.

Furthermore, there is a degradation in productivity and in the efficiency of the assembling process because the hinge mechanism includes two hinge modules each consisting of a large number of elements (the hinge housing, the hinge shaft, the hinge cam, the spring, and the hinge cover).

Moreover, the springs of the hinge modules disclosed in the U.S. Pat. No. 5,697,124 are too strong to make assembling thereof easy. Due to such a strong spring force, the hinge covers may be frequently separated or damaged, thereby causing the springs to become disengaged or be lost.

SUMMARY OF THE INVENTION

Accordingly, the present invention is provided to resolve the above mentioned problems, and an object of the present invention is to provide a hinge mechanism for use with a portable phone which is capable of easily being assembled.

Another object of the invention is to provide a hinge mechanism for use with a portable phone which is compact.

Another object of the invention is to provide a hinge mechanism for use with a portable phone which eliminates the use of separate elements, such as an independent hinge cover or cap, adapted to support a spring, thereby increasing the reliability in the opening and closing operations of a folder.

Another object of the invention is to provide a hinge mechanism for use with a portable phone which is capable of achieving stable opening and closing operations of a folder.

Another object of the invention is to provide a hinge mechanism for use with a portable phone which is capable of mounting a magnet thereto.

In accordance with the present invention, these objects are accomplished by providing in a portable phone including a phone body, a cover, and a hinge mechanism adapted to mechanically couple the cover to the phone body, the hinge mechanism generally having at least one hinge module mounted to the phone body and adapted to hinge the cover with respect to the phone body for opening and closing the cover. The hinge module generally includes a hinge housing having a bottom wall, and a pair of opposite lateral end walls spaced from each other, one of the lateral walls having a hole, and also having a pair of opposite longitudinal end walls spaced from each other.

The hinge module further includes a hinge shaft having a projection or mountain-shaped portion provided with a pair of opposite cam surfaces at one longitudinal portion thereof and a shaft portion at the other longitudinal portion thereof. Preferably, the shaft portion is provided at a free end thereof with a pair of opposite circumferential flat surfaces and a pair of opposite circumferential curved surfaces. The hinge